

What is claimed is:

1. An electrically drivable light modulator having liquid crystal layers, which are disposed one behind the other and are enclosed between transparent plates having a surface anisotropy that orients the molecules of the liquid crystals and having electrodes for generating an electric field in the liquid crystals, wherein at least two layers (6, 8) of helical, smectic, ferroelectric liquid crystals, whose fast and slow optical axes, respectively, are disposed in parallel with the layer (6, 8) in question, and whose average optical anisotropy can be influenced by the action of the electric field (E), are situated one behind the other in the path of rays of a light beam (10) to be modulated, and in that the directions of the fast and slow axes, respectively, of the individual layers (6, 8) are rotated relatively to each other in such a way that the polarization of the light beam is the same upstream (10) and downstream (11) from the modulator.

2. The light modulator as recited in Claim 1, wherein the two liquid crystal layers (6, 8) are situated one behind the other such that the slow optical axis of the first layer (6) is normal to the slow optical axis of the second layer (8), the fast optical axis of the first layer (6) is normal to the fast optical axis of the second layer (8), and the orientation of the slow and fast optical axes of the two layers (6, 8) in relation to one another is retained at all times during application and variation of the control voltage.

3. The light modulator as recited in one of the preceding claims, wherein the liquid crystal layers are enclosed between two transparent plates, on whose electrodes a control voltage can be applied to generate an electric field.

4. The light modulator as recited in either Claim 1 or 2, wherein the liquid crystal layers (6, 8) are enclosed in each case between two transparent plates (1' and 2', 3' and 4'), on each of whose electrodes (1 and 2, 3 and 4) a control voltage can be applied to generate an electric field (E) in each case.

5. The light modulator as recited in one of the preceding claims, wherein the liquid crystal layers (6, 8) exhibit the same average refractive indices, have the same thickness, and are able to synchronously receive the same control voltages.

6. The light modulator as recited in Claim 4, wherein the ratio of the control voltages to one another is adjustable to compensate for the changes in the polarization of a light beam passing through.

7. The light modulator as recited in one of the preceding claims, wherein the control voltages for the individual liquid crystal layers are adjustable in order to compensate for manufacturing tolerances.

8. The light modulator as recited in one of the preceding claims, wherein the liquid crystal layers are composed of a smectic liquid crystal mixture FLC-472/FLC-247.

9. The light modulator as recited in one of the preceding claims, wherein the liquid crystal mixture is composed of 60 % by weight of phenyl pyrimidine and 40 % by weight of an achiral, smectic A matrix having a chiral doping on the basis of disubstituted ether of bis-terphenyl dicarboxylic acid.

10. The light modulator as recited in one of Claims 1 through 8, wherein the liquid crystal mixture is composed of 60 % by weight of phenyl pyrimidine and 40 % by weight of an achiral, smectic C matrix having a chiral doping on the basis of disubstituted ether of bis-terphenyl dicarboxylic acid.

11. An adaptive optical device, characterized by a field of light modulators, configured in a raster-type array, according to one of the preceding claims, the field being situated in the path of rays of the device, and each individual light modulator being able to be driven to compensate for unsharpness occurring on a point-by-point basis, of an image to be processed.

12. The adaptive optical device as recited in Claim 11, wherein the light modulators are mounted on a common substrate.

13. The adaptive optical device as recited in one of Claims 11 or 12, characterized by the arrangement of a digital camera upstream from the image sensor, the image picked up by the camera being able to be fed to an image-analysis device to determine point-for-point unsharpness in the image, and the adaptive optical device being able to be driven by the image-analysis device to compensate for the unsharpness.

14. The adaptive optical device, as recited in one of Claims 11 or 12, characterized by the arrangement in an optical observational device, the image to be observed being able to be fed in parallel to an image-analysis device to determine point-for-point unsharpness in the image, and the adaptive optical device being able to be driven by the image-analysis device to compensate for the unsharpness.

15. The adaptive optical device, as recited in one of Claims 11 or 12, characterized by the arrangement in a camera, the image to be observed being able to be fed to an image-analysis device to determine point-for-point unsharpness in the image, and the adaptive optical device being able to be driven by the image-analysis device to compensate for the unsharpness.

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